MCP361 Industrial Engineering Lab: Assignment 7

Due date: 9:00 AM September 11, 2024

— **Naming convention for files for this assignment is as follows**
MCP361_Entry#_Assignment7.py
MCP361_Entry#_Assignment7_Problem1.txt
MCP361_Entry#_Assignment7_Problem2.txt
MCP361_Entry#_Assignment7_Problem3.txt
MCP361_Entry#_Assignment7_Problem4.txt
MCP361_Entry#_Assignment7_Problem5.txt
MCP361_Entry#_Assignment7_Problem6.txt
MCP361_Entry#_Assignment7.pdf

— **Submit a zip file to Moodle named as follows**
MCP361_Entry#_Assignment7.zip

Remember the general guidelines for the assignments given at the start of the course.

The goal is to compute pure strategy Nash equilibria for the two-player games that will be shown below. You may refer to Lecture 12 of Dr. Yong Wang's online "Operations Research" course: -

https://www.youtube.com/playlist?list=PLgA4wLGrqI-ll9OSJmR5nU4lV4_aNTgKx

(2 marks) You should fix a protocol by which a user shall represent the following games in a text file and then also fix a protocol whereby your code may read the following games from that text file. **Explain** your protocol in PDF. Stick to the same protocol for each of the games below.

(6 marks) Now, code a single python script to compute equilibria for each game and your code should output the result as follows for each equilibrium, for example, if there are two equilibria your output should read as follows

Player 1 plays its Strategy 2 and Player 2 plays its Strategy 4

Player 1 plays its Strategy 3 and Player 2 plays its Strategy 3

Q1)

(10, 8)	(2, 2)
(0, 0)	(8, 10)

Q2)

(3, 4)	(4, 3)
(6, 1)	(5, 2)
(1, 6)	(2, 5)

Q3)

(2, 9)	(1, 4)	(7, 6)
(9, 2)	(8, 3)	(3, 7)
(5, 5)	(4, 8)	(6, 1)

Q4)

(–30, –30)	(40, 0)	(40, 0)	(–30, –30)	(5, –15)
(0, 40)	(12, 12)	(–8, 32)	(12, 12)	(6, 26)
(0, 40)	(32, –8)	(12, 12)	(–8, 32)	(16, 16)
(–30, –30)	(12, 12)	(32, –8)	(12, 12)	(–9, –9)
(–15, 5)	(26, 6)	(16, 16)	(–9, –9)	(20, 20)

Q5)

(Player 1, Player 2)	Strategy 1	Strategy 2	Strategy 3
Strategy 1	2, 2	2, 1	2, 0
Strategy 2	3, 0	4, 1	1, 1
Strategy 3	3, 1	1, 1	1, 1

Q6)

3,3	3,6	0,9	3,12
3,6	2,9	0,12	0,3
0,9	0,12	3,3	3,6
0,12	0,3	3,6	3,9

(1 mark) In PDF file, **show** the code output for each game. Make sure output is in form of English sentences as shown above.

(1 mark) In PDF file, manually **derive** the answer for Q5 matrix shown above.